Prevention of Fall-Related Injuries: A Clinical Research Agenda

2009-2014

VISN 8 Patient Safety Center of Inquiry

Department of Veterans Affairs

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Executive Summary

Decades of research have been conducted on fall-related risk factors, prevention strategies, and treatment of injuries. Most of the early research efforts focused on intrinsic and extrinsic risk factors for falls in the elderly, contributing to fall screening tools and risk assessment protocols for this targeted patient population. There is strong evidence that the etiology of falls is multifactorial, requiring interdisciplinary approaches to reduce modifiable risk factors [1].

Falls are the leading cause of injury death in the U.S. elderly population. "In 2002, more that 12,900 older adults died as a result of falls, but 1.67 million older adults were treated in emergency departments (EDs) for fall related injuries and 338,000 were subsequently hospitalized. … Older men were 22% more likely than older women to sustain a fatal fall during this time period. U.S. hospitalization rates for hip fracture increased 32% for women while rates for men remained stable. In 2000, non-fatal fall-related injuries among older adults required medical care at the cost of "$19 billion dollars, of which 63% ($12 billion dollars) were for hospitalizations, 21% ($4 billion dollars) for emergency department visits, and 16% ($3 billion) for out-patient visits. … Fractures accounted for 35% of non-fatal injuries but 61% of costs" (Stevens, Corso, Finkelstein, & Miller, 2006).[2] Thus, we assert that health care providers and administrators must shift their practices and resources to protect patients from falls and resulting injuries. This paradigm shift requires in-depth assessment of fall and injury risks, beyond basic screens, and individualized plans of care to reduce risks. The emphasis for patient safety interventions surrounding falls must be patient-centered, multifactorial individualized care plans, and population-based. Yet, we recognize that the link between risk assessment and the effectiveness of interventions that are population-based remains weak. The phenomenon of falling is extremely complex, and therefore demands a multivariate approach with coordination across many research disciplines to test clinical interventions across populations and settings.

Originally, in February 2001, fall experts from the United States and Canada participated in a two and a half day national conference, "Fall Prevention and Management: Promoting Patient Freedom and Independence." After presenting state-of-the-art knowledge and practices in fall prevention, risk assessment, and interventions, they joined with invited guests over another day and a half, in a research agenda-setting session. Participants reached consensus on the research needed to advance both science and clinical practice. A 5-year research agenda was adopted and provided broad direction for our research program.[3]

In 2007, fall experts nationally known for their clinical and research leadership were invited to our 2nd falls research agenda setting session. Each invited expert also served as faculty for our 8th Annual Evidence-based Fall Prevention Conference, Transforming Fall Prevention Practices. Faculty specifically prepared their lectures to identify strength of evidence in their field of practice and study, along with gaps. The identification of gaps served as the foundation to update our research agenda. This agenda uniquely focused on prioritized clinical expertise and research findings to prevent injury due to falls, the emergent priority of our 2007 VISN 8 Patient Safety Center of Inquiry.

This report details the collective consensus of these experts as they established the research agenda for the next 5 years. During 2008, we perfected this agenda into 4 domains with research studies that could be completed within a 5 year timeframe. Thus, this agenda will guide our program of research for 2009-2014. Teams of experts from medicine, nursing, psychology,

physical therapy, gerontology, and bioengineering prioritized research needs across specialty fields, populations and care continuums. Research priorities are grouped into four research domains:

1. Clinical Intervention
2. Biomechanics & Motor Control Research
3. Implementation Research

We hope this research agenda will influence funding agencies to establish requests for research proposals to advance knowledge of falls prevention and management.

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PREVENTION OF FALL-RELATED INJURIES:
A CLINICAL RESEARCH AGENDA
2009-2014

EVOLUTION OF EVIDENCE ASSOCIATED WITH FALL PREVENTION AND FALL PROTECTION

Decades of research have been conducted on the risk, prevention, and management of falls. Extensive research addresses identified intrinsic and extrinsic fall risks and the importance of screening for these risks. The emphasis for patient safety interventions surrounding falls and injury prevention must be patient-centered, multifactorial individualized care plans, and population-based. Yet, the link between risk assessment and the effectiveness of population-based interventions remains weak.

Early efforts focused on risk factors for prevention of falls in elderly, largely ignoring interventions and also "lumping all fallers together". Research then moved into fall screening and risk assessment, but these two processes were often confused, leading to confusing about linking risk to specific interventions. Still the focus was on fall prevention and elderly, lumping all fallers together. Next, research focused on interventions, but the focus was on fall prevention and elderly, lumping all fallers together.

The new agenda begins to question the focus on fall prevention, and addresses fall protection and injury prevention, emphasizing therapeutic risk associated with activity and community participation. This new agenda also recognizes the need to segment high risk patient populations to identify unique risks and tailor interventions (e.g., PN, w/c fallers, etc), using new 3-D techniques to assess gait and balance, as well as other key risk factors. The new agenda also goes beyond fall screening and fall risk assessment, emphasizing the need to screen individuals, follow up with in depth risk assessment protocols, and to link interventions to specific modifiable risk factors.

As more evidence is available to clinicians, there is a need for translational research efforts to develop clinical tools to make it easier for clinicians to provide evidence-based practice and to explore more effective and efficient strategies for implementing evidence based programs across clinical settings and facilities. To advocate for evidence-based practice in fall prevention and fall protection, the VISN 8 Patient Safety Center of Inquiry held our second international call across professions and experts to articulate the state-of-the science, elucidate research priorities, and facilitate the translation of research into practice.

RESEARCH AGENDA-SETTING PROCESS

In April, 2007, fall experts from the United States and Canada participated 3 day national conference, "Transforming Fall Prevention Practices." After presenting state-of-the-art knowledge and practices in fall prevention, risk assessment, and interventions, they joined with invited research methodologists and expert clinicians over another half day for the research agenda-setting session. Participants reached consensus on the research needed to advance both science and clinical practice.

Priorities were grouped into four research domains:

1. Clinical Interventions
2. Biomechanics
3. Technology
4. Implementation / Translation

After agreeing upon the underlying assumptions and criteria for selecting each priority research topic, the participants defined research priorities within each domain. They also acknowledged individual research priorities and biases within the larger mission of this research agenda-setting session. The criteria used for selecting research priorities were:

1. The need for consensus among all members,
2. The feasibility of the research being conducted within five years,
3. The presence of an existing program of research on which to build, and
4. The fit with the mission and vision of VHA in primary health promotion, patient safety, function and independence.

These proceedings begin with an overview of the research setting agenda process, followed by prioritized research objectives selected for each section.

Drs. Pat Quigley and Andrea K. Hixon guided the group process. Each work group reviewed research progress made from the 2002-2007 agenda, and then began to identify new priority research areas that build a program of research. This process was similar to brainstorming. All research topics were recorded. Following two hours of initial group teamwork, the entire group gathered for team reports. Each team's spokesperson presented the group's respective list of research topics. After all teams reported, an open forum followed for feedback, clarification and additional priorities.

All members had input into the research priorities that emerged from all four groups. All participants agreed that our greatest challenge is to research effective strategies to integrate evidence into practice, thus we added a new research domain: Implementation/Translational Reserach. These work groups worked for two hours on their selected research areas as they developed research priorities. Each group's research priorities were presented to the entire group for input.

CLINICAL INTERVENTION RESEARCH

1. Introduction

We examined the current state of science relevant to clinical intervention research and developed a research agenda for studies that can be conducted as a 5-year research program likely to result in new discoveries, improved clinical practice, reduced variations in practice, and improved patient outcomes. Clinical intervention research is needed to test the effects of specific interventions related to special populations, medication prescribing, clinical units and staffing, and interdisciplinary approaches to fall prevention [4]. Both experimental and non-experimental designs are appropriate in these studies. The members emphasized the need for clinical trials and other prospective study designs rather than relying solely on retrospective epidemiological approaches and using fall related injuries rather then falls as the ultimate outcome.

2. State of the Science

The consequences of falls include patient injury, discomfort, increased morbidity and mortality, treatment expenses, decreased quality of life, and professional liability. The most serious consequences of falls are hip fractures and intracranial bleeds. However, adverse outcomes go beyond the injuries sustained as a result of a fall [5]. Though an injury may not result from a fall, a faller may harbor a fear of a repeat fall with consequent, restriction of activity and loss of confidence, mobility and independence [6]. The evidence supports that multidisciplinary, multifactorial, health/environment risk factor screening/intervention programs are effective for fall prevention in the community for both unselected population of older people, and for older people with a history of falling or selected because of known risk factors, and in residential care facilities[7]. Individual interventions shown to be effective included muscle strengthening and balance retraining, individually prescribed by a trained health professional, home hazard assessment and modification for older individuals with a history of falling, withdrawal of psychotropic medications, cardiac pacing for fallers with cardioinhibitory carotid sinus hypersensitivity and a 15 week Tai Chi exercise intervention. Interventions with unknown effectiveness are group-delivered exercise interventions, individual lower limb strength training, nutritional supplementation including vitamin D with or without calcium, interventions using cognitive/behavioral approach and others.[8]

Evidence looking at specific interventions to decrease fall or injury risk in certain high risk populations like Parkinson's disease, stroke, knee osteoarthritis or peripheral neuropathy is missing.[9]

Traditional fall prevention and fall management programs have been less than fully effective in preventing falls in part because they have focused on environmental safety and physical

restoration after a patient has fallen and sustained the negative consequences of the fall.[10] Traditional programs focus on physical skills and the interaction of the body with the environment, but fail to implement interventions that apply protective wear to the patient that reduces the fall impact when a patient does fall. The evidence for interventions aimed at fall protection, like hip protectors, is mixed[11]. While they have been shown effective for hip fracture prevention in a number of cluster randomized trials in nursing home population, that was not confirmed in individually randomized trails or in community living older adults[12],[13]. The limitations of those studies included a low adherence rate and issues related to durability of different brands of hip protectors and a need to replace them, suggesting the need for further research.[14]

While a number of medication classes have shown association with increased risk for falling or injury[15, 16], there is a paucity of evidence when it comes to medication management interventions, except for withdrawal of psychotropic medications, which commonly is not feasible due to need for treatment of depression, anxiety of psychosis in older people. There is no evidence on availability of safer pharmacologic or non-pharmacologic alternatives.[17]

3. Research Agenda by Priority Areas

a. Special Populations (Cochrane Review - 2006)

- Develop and test effectiveness of multifactorial interventions for special vulnerable populations at risk for falls ***and*** also those at risk for serious injury that results in loss of function or death, such as:
  - Newly disabled[18], [19]
  - Cognitively impaired[20]
  - Wheelchair-bound [21]
  - Diagnosed with osteoporosis[22],[23]
  - Post-operative [24],[25]
  - Using anticoagulation therapy[26],[27]
  - Over age of 85 [28]
- Examine factors that enhance positive outcomes in seriously injured older adults.

b. Medications

- Examine the role of medication reconciliation on falls and fall-related injuries.
- Compare the effects of different psychotropic medications from the same class on gait and balance to determine the safest prescribing regime
- Analyze alternatives to medications to promoting sleep
- Describe the biomechanical markers that best indicate that patient is able to safely compensate and adapt to medication side effects.

c. Clinical Units and Staffing

- Examine nurse staffing models on the number and severity of falls and fall-related injuries.[29]
- Analyze the effectiveness of 1:1 use of sitters or hourly nursing surveillance rounds on the number and severity of falls and fall-related injuries among inpatients (acute care and long term care settings).[30]
- Correlate key aspects of environmental design (e.g., space/layout, lighting, flooring, furniture arrangement, and proximity to toilet) on the number and severity of falls and fall-related injuries across settings of care.
- Test the use of a designated "Safe Room" for high risk patients affect the number and severity of falls and fall-related injuries.
- Examine the effects of post fall safety huddles on repeat falls and injuries among inpatients.

d. Interdisciplinary Approach to Fall Prevention:

- Determine the appropriate use of fall risk screening tools in generating interdisciplinary interventions to prevent falls among inpatients.
- Examine the best interdisciplinary intervention protocol (dose, frequency, and intensity) for treatment of known fallers or those identified at high risk for falls.

BIOMECHANICS AND MOTOR CONTROL RESEARCH

1. Introduction

Here we discuss biomechanical and motor control approaches to reductions in falls and fall-related injuries only as it relates to clinical detection of deficits and interventions to reduce falls and fall-related injuries prior to ground impact. While ground impact energy attenuation mechanisms and injury modalities are also biomechanical in nature, these topics are not covered here.

Biomechanical and motor control research is needed to test the effects of specific interventions related to concurrent tasks, compensatory reactions, falls in understudied settings or related to mobility device, changes across the lifespan, and outcomes measurement and translation
Both experimental and non-experimental designs are appropriate in these studies. The members emphasized the need for clinical trials and other prospective study designs rather than relying solely on retrospective epidemiological approaches and using fall related injuries rather then falls

as the ultimate outcome.

2. State of Science

Concurrent Tasks

Concurrent tasks during locomotion can destabilize the gait of elderly fallers[31,32] and may identify individuals at risk for repeated falls[33, 34], but task- and population-specific effects need to be better characterized, as different populations can differentially prioritize the same task[32]. Temporally controlling the performance of one task (e.g. using a treadmill to regulate gait speed) so that only the other is free to vary can help isolate these effects, but at the cost of ecological validity. If both the locomotor and concurrent tasks are unconstrained, the performance on both tasks should be quantified, as this variability in task prioritization may be more important than the task performance itself- for example, the "stops walking when talking" test[35] is a predictor of falls because it reveals a lack of capacity via the shift of priority from gait to conversation.

Training interventions including concurrent tasks, particularly those in which task priority is varied, show promise in improving balance in older adults[36].

Compensatory Reactions

Compensatory reactions are departures from a steady standing or gait in order to recover from some disturbance. Compensatory reactions have been elicited from standing via translating[37, 38] or rotating[39] platforms, waist pulls[40, 41, 42], moving visual surrounds (visual push)[43], lean releases[44, 45, 46], and even pendulum impacts[47], Compensatory reactions have been elicited during gait via trips[48, 49], slips[50, 51], and uneven or unstable surfaces[52, 53].

These studies have generally shown that older and more impaired subjects are less able to maintain balance, recover from falls, and adapt to novel situations. More importantly, they have identified specific outcome measures that indicate impairment and fall risk, but these outcomes generally require laboratory testing to measure. Translation of these findings and measurement methods is ongoing, but more research in this area is needed.

Falls in Understudied Settings or Related to Mobility Device

Environmental fall risk factors have been identified [54, 55, 56], but subsequent studies have failed to support an association between environmental hazards and non-syncopal falls[57] and interventions to reduce environmental risk factors have failed to reduce fall rates[58, 59, 60]. Still, the majority of falls in residential care facilities[61] and 36% of 380 falls at home occur in the bedroom[57], but there

is little data in the literature on the specific mechanisms of these and other setting-specific falls and how this environment may have contributed to the fall event.

Canes and walkers can improve balance and mobility, but they can also interfere with the ability to maintain balance in certain situations, and the strength and metabolic demands can be excessive[62]. Further research is needed to determine if other mobility devices have similar unintended and unknown drawbacks.

Changes Across the Lifespan

Most biomechanics and motor control studies investigate discrete groups of "young" vs. "old", which leaves a large gap in our understanding of how one group changes into the other. More studies focusing of the identification of when and how age-related effects occur are needed to fill this knowledge gap. This information could lead to targeting of interventions in middle age to preserve or restore function at critical events or age ranges.

Outcomes Measurement and Translation

Some examples of translation of research measures to a clinical setting are the "stops walking when talking" test for concurrent tasks[63], the use of computerized dynamic posturography by NeuroCOM (www.onbalance.com) and other force plate based measures of postural sway, and pressure sensor-based walkways, such as the GaitRite walkway[64] (www.gaitrite.com) that allow clinics to record quantitative spatiotemporal gait parameters without a full motion capture system.

Laboratory research into compensatory reactions and fall recovery have also provided invaluable research data on how various populations recover from impending falls, but there is little research in the translation of these controlled perturbations and findings to clinical settings at this time.

The tripping research of Grabiner and colleagues has been transitioned to the clinic with the ActiveStep treadmill (http://www.simbex.com/ActiveStep). Other perturbation-based training programs have been completed[65] and are underway[66], but devices to administer these training programs in clinical settings are not yet commercially available.

Gait variability has received substantial attention as an outcome measure in recent biomechanics

and motor control literature. Increased variability of foot placement both spatially (position of footfalls) and temporally (timing of footfalls) on smooth, level surfaces has been associated with older age[67,68] and increased fall risk[69,70,71], but the direction of the effects and which measure of variability is most predictive remains uncertain. For example, Hausdorff et al. found that temporal stride variability was predictive of future falls when other measures (strength, balance, gait speed, functional status, and mental health status) did not[72]. However, spatial variability measures were not recorded in this study and Owings and Grabiner found step width variability to be a more meaningful descriptor of locomotion control than step time variability[73]. To further complicate interpretations of gait variability, Maki found that decreased step width variability combined with increased step width prospectively discriminated fallers from non-fallers[71]. Even more ambiguously, the largest study of gait variability to date found no association of step time variability with recent fall history and that either too much or too little step width variability was associated with recent fall history, but only in subjects who walked at or near normal gait speeds[74].

This ambiguity and conflict in gait variability findings is likely to stem from the conflicting objectives of gait efficiency and safety or stability. For example, older subjects have been shown to utilize greater step widths to improve lateral stability at the cost of reduced walking efficiency[75]. Note also that high variability does not necessarily imply reduced stability[76]. Gait is inherently most efficient at a specific cadence, step width, and step length[75, 77, 78, 79], but this optimum gait pattern is difficult and may be undesirable to maintain in the presence of disturbances or impairment. While the ability to maintain a metabolically-optimal gait pattern may indicate higher functional status and hence, reduced fall risk, the ability to vary gait to adapt to changing environment or situation is also essential for safe ambulation.

3. Research Agenda by Priorities Areas

a. Concurrent Tasks

- Determine the relationships between cognition/executive function and mobility tasks and how these relationships affect the risk of falls and fall-related injuries.
- Develop training protocols utilizing concurrent tasks reduce to fall risk.
- Ascertain how visual attention, both active and covert, influences fall recovery and if it can be improved by training.
- Determine the effects of medications on concurrent task performance.

b. Compensatory Reactions
    - Establish the extent of overlap between voluntary and compensatory reactions (i.e. foot-in-place, protective stepping, and grasping) and if training in voluntary movements can translate into improvements in compensatory reactions.
    - Develop training protocols and strategies for teaching that optimally combine voluntary and compensatory components to maximize reductions in fall-related injuries.
    - Determine how these optimal training protocols vary for different at-risk populations (e.g. community dwelling older adult, Parkinson's Disease, Peripheral neuropathy, stroke, TBI, frail elderly, etc.).
    - Determine the effects of medications on the ability to utilize compensatory reactions.

c. Biomechanics of Understudied Setting/Specific or Mobility-Device Related Falls
    - Capture (probably via automated image processing techniques and algorithms to maintain confidentiality) real-life falls in community settings to determine concurrence with laboratory findings.
    - Establish how mechanisms of fall prevention and protection vary with fall direction.
    - Understand the biomechanics and neural control mechanisms associated with falls from or associated with:
        - Wheelchairs and scooters
        - Assistive device use (canes, walkers, crutches, etc)
        - Bed
        - Bathroom (toilet, shower, shower chairs, etc)
        - Chairs
        - Stairs
        - Curbs

d. Across the lifespan
    - Determine when age-related changes in mobility and fall biomechanics develop during the aging process.
    - Develop interventions to target any critical intervals in the aging process.
    - Establish early predictors of future fall risk.

e. Outcomes Measurement and Translation
    - Translate proven laboratory-based measurements and training protocols to clinical and home/community settings.
    - Translate the realism, complexity, and variability of home/community settings into laboratory studies.

3. IMPLEMENTATION/TRANSLATION RESEARCH

1. Background

Our Center adapted the VA HSR&D Quality Enhancement Research Initiative (QUERI) Model (http://www.hsrd.research.va.gov/QUERI/) to provide a framework for translating research about falls into clinical practice. These steps are:

(1) Evaluate the strength of the evidence to identify knowledge gaps to target for future inquiry and findings ready for translation into practice;

(2) Define existing practice patterns and outcomes across the VA and determine current variation from established best practices;

(3) Identify and implement interventions to change practices to strengthen patient, provider, and systems level safety defenses, through the design of tools and products specifically designed to promote patient safety, such as clinical tools; cognitive aids; educational materials; policy reports; VHA information letters, handbooks, and/or directives; and others;

(4) Improve technology safety defenses through biomechanics, human factors engineering, and other principles of design;

(5) Evaluate and document the process and outcomes of best practices at the patient, facility, VISN, and VHA level; and

(6) Collaborate with NCPS to develop a VHA business case and implementation plan to export evidence into practice

While we recognize that implementation science is rapidly evolving in general, we advocate the use of active rather than passive dissemination methods[80]. Examples of these methods include local opinion leaders to persuade colleagues and serve as role models for implementing best practices,[81] academic detailing whereby experts deliver content and tools to providers to facilitate implementation,[82] matching implementation strategies and clinical tools to known barriers at patient, provider and organizational levels,[83] incorporating current models of behavior change that address knowledge, attitudes, social influences and self-efficacy of providers and patients (e.g. Theory of Planned Behavior[84]), and using current theories related to implementation to guide the research in this area (e.g. Diffusion of Innovation [85]). In general, these methods have been found to increase the rate of uptake of best practices and evidence-based interventions in clinical settings.

2. Strength of Evidence.

The strength of evidence to support fall prevention and fall-injury prevention interventions varies by intervention and by setting. While evidence is beginning to emerge for the community and long term care, we felt that the evidence base for acute care was non-existent. Table 1 summarizes at a gross level the strength of evidence for a variety of interventions with the strongest being for multi-faceted interventions for high risk individuals. We believed that the Guideline for the Prevention of Falls in Older Persons by

the American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopaedic Surgeons Panel on Falls Prevention provides the best guidance for identifying the research that re ready for translation into primary care for the management of community dwelling older adults.[86] While the strength of evidence is an important consideration in deciding whether or not an intervention is ready for wide-spread use, sometimes in patient safety the potential benefits of an intervention that is not strongly supported by scientific evidence out-weighs the harm risk of the intervention. For example, although the evidence from randomized controlled trials to support hip protector use is mixed, they have been shown to attenuate the force of impact in laboratory settings.[87] Therefore, use of hip protectors may be advocated because they may work, are low-cost , and without significant risk. Furthermore, the evidence for hip protectors exceeds the evidence for many other interventions in geriatrics. Thus, the risk- benefit ratio is favorable for their use even in the absence of strong evidence. Delaying this low risk intervention would unnecessarily expose thousands of people with osteoporosis to the risk of a hip fracture.

Effectiveness of Patient Safety Interventions continues to unfold as the results of both clinical trials and cohort studies are published. In the work of innovation, evidence is emerging. Our assumption supports both building and advancing the level of evidence through by quality improvement and research methods.

To increase the effectiveness and efficiency of research translation in the area of falls, a number of tools could be developed. These include:

- A business case for falls prevention programs in long term care and community settings;
- A summary of evidence from quality improvement trials;
- Clinical Practice Guidelines for Acute Care; and
- Clinical Practice Guidelines for Long Term Care.

Table 1. Strength of Evidence to Support Interventions Ready for Implementation

Intervention	Setting		
	Community	Long Term Care	Acute/ Hospital
Hip protectors	Insufficient [12]	Equivocal [14, 12]	
Remobilization Strategies post hip fracture		Insufficient[88]	
Home hazard Assessment and Environmental modifications for people with history of falls	Sufficient[7]	Sufficient[7]	
Medication management	Sufficient as part of multi-component intervention[89]	Sufficient as s part of multi-component	

		intervention[89]	
Strength/balance interventions	Sufficient as part of multi-component intervention[7, 89,]	Insufficient [7]	
Tai Chi	Sufficient [7]	Insufficient[7]	
Progressive Resistance Strength Training	Emerging[90]	Emerging[90, 91]	
Withdrawal of psychotropic medication	Sufficient [7]	Sufficient [7]	
Multi-factoral fall risk assessment and management	Sufficient [7,89]	Sufficient [89]	
Vitamin D	Emerging [7]	Emerging [7]	
Minimizing the use of restraints*	Insufficient[86]	Sufficient given risk of restraint use[86]	
Low beds		Weak [92]	
AGS Falls Guideline Recommendations	Strength of evidence varies[86], however, in general, the guidelines recommend: • Asking about fall • Up and Go test • Addressing risk factors • Intervening based on risk factors		
Nurse Staffing Adjustments			Emerging[93]
Multi-site Collaborative Breakthrough Approaches to Change		Emerging[94]	Emerging[94]

* Evidence from descriptive studies and quality improvement projects mainly conducted in long term care suggests that restraints do not eliminate falls. In some instances reducing the use of restraints may decrease the risk of falling. Additionally, restraints limit mobility and increase the risk of other hazards related to immobility.[95]

Questions about Implementing Best Practices and Evidence

1. What are the current practice variations in fall prevention and fall protection strategies across settings of care and facilities?
2. What are the barriers and facilitators to guideline recommended care associated with

prescribing behaviors that incorporate fall risk?

3. What is the impact of academic detailing on medication prescriptive practices in primary care for reducing fall risk?
4. Which strategies promote acceptance and sustainability of fall prevention and fall protection interventions over time across care settings?
5. What are the barriers and facilitators (patient, provider, and organization) to implementing fall prevention guidelines as perceived by patients, providers and key informants across settings?
6. How effective are clinical reminders for implementing the AGS guidelines?
7. What do we know from risk perception literature that can be transferred to falls, e.g. public relations, media, social marketing?
8. How can evidence from the chronic disease self management field be adapted to falls prevention to actively involve patients in fall prevention programs?
9. What is the impact of the Centers for Disease Control and Prevention materials (posters on exercise, vision, home safety, medications) on falls awareness and on patient and provider behaviors?
10. What is the impact of academic detailing on physician prescriptions to senior center fall prevention programs or to fall prevention exercise programs?
11. How do we best raise awareness of falls and fall-related injuries in VA in outpatient settings?
12. What is the impact of academic detailing on benzodiazepine use in outpatient settings?
13. How does local opinion leadership affect fall prevention implementation in acute care and long term care settings?
14. What care models and clinical processes best promote multi-faceted interventions in across care settings, such as long term care, acute care, psychiatry and others?
15. How can the use e-codes to indicate mechanism of injury be increased in outpatient settings in VA?

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